

REMARKS

By this amendment, claims 1, 5, 16, 18, 27, and 29 have been amended, and claims 3, 6, 19, and 30 have been cancelled. Claims 1, 2, 4, 5, 7 to 18, 20 to 29, and 31 to 38 are in the case.

All claims as presented herein are fully supported by the application as filed. Entry of the amendment is respectfully requested.

Claim Rejections – 35 USC § 102

Claims 1 to 3, 8 to 16, 18, 21 to 27, 29, and 32 to 38 were rejected under 35 USC § 102(b) as being anticipated by Arendt (US 4,422,443). The Examiner suggested that Arendt discloses all of the claimed limitations. Applicants respectfully traverse this rejection.

Claim 1 is drawn to a solar collector in which the space below the absorber is ventilated. Independent claims 16 and 27 recite methods including ventilating the space below the absorber.

In contrast, Arendt teaches a solar collector in which the space above the absorber (i.e., between the absorber and the glazing) is ventilated. The inlet and outlet ports 24,26 referred to by the Examiner are for receiving the inlet and outlet manifolds 39,41 of the absorber plates 34,36 [see col. 5, l. 59-62], and do not provide ventilation. Arendt specifically teaches ventilating the space above the absorber at col. 10, l. 7-21.

Clearly the claimed invention is not anticipated by Arendt. Withdrawal of the rejection and reconsideration are respectfully requested.

Claim Rejections – 35 USC § 102/103

Claims 1 to 38 were rejected under 35 USC § 102(b) as being anticipated by, or, in the alternative, under 35 USC § 103(a) as obvious over Morse (US 246,626), Niedermeyer (US

4,226,225), Cameron (US 4,469,087), Lorenz (US 4,237,865), and/or Palmer (US 4,219,009) as applied in Applicants' International Application No. PCT/CA2004/000162.

The invention relates to a solar collector with stagnation (overheating) protection in which an inlet and an outlet are provided that passively ventilate the space below the absorber. This is accomplished in the invention by providing an air inlet and outlet in the bottom portion of the solar collector (see Fig. 1B). This represents a significant shift in thinking, which is evident from a review of the available art. That is, in prior solar collectors, vents were invariably located on the tops, ends, or sides of the collectors, so as to easily establish cooling by convection. However, vents were not disposed in the bottom portions of prior solar collectors because of the inherent difficulty in establishing the required convection. The inventors have found that passive ventilation of the channel is possible with such positioning of the inlet and outlet, when the lower surface of the absorber is radiatively coupled to the channel below the absorber, as recited in amended claims 1, 16, and 27. Such radiative coupling involves providing at least some radiation of heat from the lower side of the absorber into the channel below the absorber, which is accomplished by making the lower side of the absorber a high-emissivity surface (see, for example, page 11, lines 23 to 33). The cited art does not teach or suggest this combination of features. The claims have been amended to clarify these and other aspects of the invention.

For example, claim 1 as amended herein reads:

1. A solar collector comprising:
 - a top portion comprising glazing,
 - a bottom portion;
 - an absorber adapted for circulating a heat transfer fluid therethrough, the absorber disposed between said top portion and said bottom portion for absorbing solar energy received through said glazing, said absorber in a spaced relationship above said bottom portion such that a channel is defined between a lower surface of said absorber and an upper surface of said bottom portion;
 - an inlet and an outlet associated with said bottom portion and at substantially opposite ends of said channel ; and
 - a damper for opening said outlet at a temperature equal to or above a first selected temperature and for closing said outlet at a temperature equal to or below a second selected temperature;
 - wherein said lower surface of the absorber is radiatively coupled to at least one other

surface defining said channel;

wherein opening of said damper passively ventilates said channel; and

wherein said first and second selected temperatures are below a stagnation temperature of the solar collector.

Insofar as the claim rejections might apply to the amended claims, the rejections are respectfully traversed as follows.

Niedermeyer relates to a solar collector with openings 30,37 to prevent overheating. In contrast with the invention as discussed above, the openings are located in the side panels (see 31 in Figs. 4 and 5) of the collector. Further, Niedermeyer does not teach or suggest radiatively coupling the lower surface of the absorber with the space below the absorber. For at least these reasons, Niedermeyer does not anticipate or render obvious the claimed invention. Withdrawal of the rejection is respectfully requested.

Morse, Lorenz, and Cameron relate to solar collectors used as space heaters for heating air that is directed into a building. As such, Morse, Lorenz, and Cameron do not teach solar collectors with absorbers for absorbing solar energy received through glazing and adapted for circulating a heat transfer fluid therethrough. Morse is silent with respect to protection from overheating. Lorenz and Cameron teach use of vents at opposite ends of the collectors. None of the references teaches radiatively coupling the lower surface of the absorber with the space below the absorber. For at least these reasons, Morse, Lorenz, and Cameron do not anticipate or render obvious the claimed invention. Withdrawal of the rejection is respectfully requested.

Palmer relates to a solar collector in which the space above the absorber is vented, and in which vents with gates 34,36 are provided in the end panels of the collector. This is distinct from the claimed invention. For at least these reasons, Palmer does not anticipate or render obvious the claimed invention. Withdrawal of the rejection is respectfully requested.

Claim Rejections – 35 USC § 103

Claims 4, 17, and 28 were rejected under 35 USC 103(a) as unpatentable over Arendt (US 4,422,443). The Examiner suggested that the claimed arrangement of the outlet being elevated relative to the inlet is an obvious modification based on design choice. Independent

claims 1, 16, and 27 have been amended and it is submitted that the rejection of claims 4, 17, and 28 is rendered moot. Withdrawal of the rejection and reconsideration are respectfully requested.

Claims 6, 19, and 30 were rejected under 35 USC 103(a) as unpatentable over Arendt (US 4,422,443). Applicants respectfully disagree; however, in an effort to expedite prosecution, the rejected claims have been cancelled, obviating the rejection.

Claims 7, 20, and 31 were rejected under 35 USC 103(a) as unpatentable over Arendt (US 4,422,443). The Examiner was of the opinion that Arendt discloses substantially all of the claimed limitations, except for the specific emissivity of 0.5. Applicants respectfully disagree.

As discussed above, the invention relates to a solar collector in which the space (i.e., channel) below the absorber is ventilated. As amended, the independent claims recite that the lower surface of the absorber is radiatively coupled to at least one other surface of the channel. Claims 7, 20, and 31 relate to this aspect of the invention by reciting the emissivity of at least one surface of the channel. Emissivity is a measure of the ability of a surface to radiate energy, relative to a perfect emitter. Emissivity ranges between 0 and 1, the latter corresponding to a perfect emitter. High emissivity, recited in the rejected claims, therefore facilitates radiative coupling of the lower surface of the absorber to the channel below the absorber, by facilitating radiation (i.e., heat loss) into the channel.

However, Arendt teaches a solar collector in which the space above the absorber (i.e., between the absorber and the glazing) is ventilated. Arendt is silent with respect to emissivity of the surfaces below the absorber. In fact, Arendt teaches insulating the space below the absorber (see 38 in Figure 3), which teaches away from the instant invention. Withdrawal of the rejection and reconsideration is respectfully requested.

It is believed that the foregoing constitutes a full and complete response to all issues and rejections raised by the Examiner. It is submitted that the application is now in condition for allowance and early action in this regard is respectfully requested.

Should the Examiner wish to discuss this application, he is invited to telephone the undersigned agent at 613-533-2342.

Please charge any fees that may be required to our deposit account no. 17-0110.

Respectfully submitted,



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